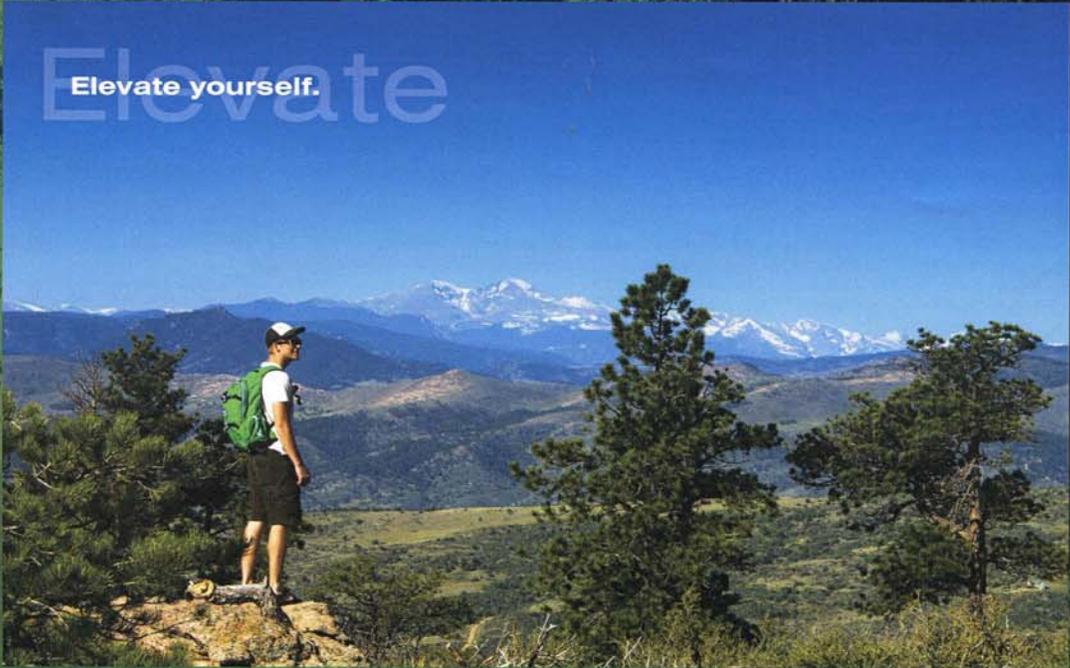




College of
Natural Sciences

Strategic Plan
“CNS 2020”

Elevate yourself.



Colorado State University

COLLEGE OF NATURAL SCIENCES

The College of Natural Sciences comprises a dynamic community of scholars in the physical, mathematical, behavioral, and life sciences. Our mission is to conduct cutting edge research in our foundational fields, to actively engage in important interdisciplinary research, and to educate and inspire the next generation of scholars, researchers, and professional leaders.

College leadership and overview as of January 2013:

COLLEGE DEANS

| | |
|-----------------------|------------------|
| Dean | Janice L. Nerger |
| Senior Associate Dean | James R. Sites |
| Associate Dean | Simon Tavener |
| Assistant Dean | Jack McGrew |

ACADEMIC DEPARTMENTS & CHAIRS

| | |
|-------------------------------------|--------------------|
| Biochemistry & Molecular Biology | P. Shing Ho |
| Biology | Michael F. Antolin |
| Chemistry | Ellen R. Fisher |
| Computer Science | L. Darrell Whitley |
| Mathematics | Gerhard Dangelmayr |
| Physics | John Harton |
| Psychology | Kurt Kraiger |
| Statistics | Jean Opsomer |

FACTS & FIGURES

Resident Instruction Budget ~\$25M

External Funding ~\$34M

172 Regular Faculty

20 Special Appointment Faculty, 30 Instructors, and 280 GTAs

3,540 Undergraduate Primary Majors

610 Graduate Students

600 BS, 115 MS, and 65 PhDs awarded annually

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CNS 2020

Vision and Mission:

The College of Natural Sciences strives for rigorous professionalism, recognized excellence, and intellectual vitality. Its culture is to think big and embrace intellectual creativity at all levels, operating under the principles of openness, inclusiveness, and integrity. It contributes its unique capabilities to the overall success of the University and is central to the University's growth and maturation as it approaches 2020. The purpose of this CNS 2020 document, in parallel with CSU 2020, is to guide the College's thinking and inform its investment decisions on both immediate needs and long-term goals.

Five Strategic Values:

[1] STUDENT SUCCESS

The College strives for excellence in education at all levels by offering students a healthy mix of intellectual growth and career preparation within its goal to provide every student with a positive educational experience in its classes and programs. The College emphasizes undergraduate research and internship experiences that maximize student engagement and employment opportunities. At the graduate level, the College focuses on effective mentoring towards research-based degrees. It seeks to provide outstanding and rigorous undergraduate and graduate training in the biological, behavioral, physical, and mathematical sciences, starting with effective recruitment and advising, then continuing with a creative blend of traditional, laboratory, and on-line courses. In this regard, the College of Natural Sciences views its students as producers of knowledge rather than simply consumers of knowledge.

The College is committed to contributing to an informed citizenry and, in particular, to producing the next generation of Science, Technology, Engineering, and Mathematics (STEM) scientists as well as training high-school science and mathematics teachers for the State of Colorado. Undergraduate and graduate majors are expected to be engaged learners, educated broadly across all areas of science and mathematics as well as within their particular discipline. The College is dedicated to fostering gender and ethnic diversity in its disciplines where such diversity is lagging and it is increasingly committed to providing a wide range of high quality on-line instruction to off-campus students. At the same time, it is responsive to changing educational needs, and it is implementing new approaches such as cross-disciplinary course clusters at the undergraduate level and unique on-line professional science master's programs.

The College recognizes its central role in the delivery of the All University Core Curriculum, and more generally, to support the curricular needs of many programs across the campus. It accepts the challenge of providing quality education to large numbers of students and seeks to accommodate all students in the courses they need to graduate. It has an expectation that all course instructors will provide students with clear information on course content, grading procedures, classroom demeanor, policy regarding student collaboration, and mechanisms to provide course feedback.

The College places a high value on networking amongst students and the benefits of engagement in the culture of the University. Its long-established residential learning community has provided a home for many of its students to study together with their colleagues, receive tutoring assistance, and establish life-long friendships. In addition, the College maintains strong student clubs in each of its departments, and it runs a variety of programs for student leadership development.

Objectives:

1.1 **CNS Proportion of CSU Students:** Currently, 16% of CSU undergraduate and graduate students select majors or graduate training programs within the College of Natural Sciences. As the University grows towards the targets defined in President Frank's vision for CSU 2020, the College's goal is to work closely with the Office of Admissions to simultaneously increase the proportion of science majors as well as the percentage of international and underrepresented students in the College's student body.

Success Target: 20% of CSU undergraduate and graduate students with a major within the College of Natural Sciences.

Success Target: Exceed the University's overall percentages of underrepresented and international students in CNS graduate and undergraduate programs.

1.2 **4-year graduation rate:** The 4-year graduation rate for undergraduate students at CSU is currently 39%; CNS is 40%. The goal of the College is to increase the 4-year graduation rate by 10% through a combination of recruitment, advising, class and laboratory availability, research and internship experiences, and expansion of living-learning communities.

Success Target: 50% 4-year graduation rate for CNS majors entering in 2020.

1.3 **Waitlists:** The College plays a vital role in providing courses for the All University Core Curriculum (AUCC) as well as other service courses. Currently, 64% (90,000) of all credit hours produced by the College are of this nature. As the University grows, it will be the College's responsibility to expand its offerings to accommodate the growth in the University's student body. Combined with addressing the 4-year graduation rate, it is also necessary for all students to be able to enroll in 15 credits of coursework toward their degree each semester. To achieve this goal, we must establish a sustainable financial model for instruction, maintain superior academic advising, maximize efficiency with the current space available, and add additional space especially for AUCC instructional laboratories.

Success Target: Eliminate turnaways and waitlists in all CNS courses, particularly in the AUCC.

1.4 **Undergraduate Experiences:** The College places a high value on undergraduate research and internship experiences. All eight departments currently engage undergraduates in research at some level; currently, approximately 30% of graduating seniors report having

been engaged in undergraduate research during their tenure in the College. The College goal is to increase the percentage of undergraduate majors engaged in undergraduate research across all CNS departments.

Success Target: 50% of all CNS graduates will report having been engaged in undergraduate research, internship, or relevant work experience.

- 1.5 **Residential Learning:** The College strives to integrate the academic life of students with their residence life through living-learning communities. In fall 2014, Laurel Village is scheduled to open, and the College of Natural Sciences will relocate and expand its living-learning community currently housed in Ingersoll Hall. Laurel Village is designed to house 600 students, 400 of whom will be from CNS.

Success Target: Laurel Village recognized as a model living-learning community with established programs for students in the Village.

Success Target: Active engagement of College faculty in the design and implementation of Laurel Village student programs.

- 1.6 **University Honors Program:** The College is committed to supporting the University Honors Program and encourages its departments to participate in the Program as well as offer additional Honors-only sections of courses. Currently 24% of all CSU Honors students reside within the College of Natural Sciences.

Success Target: 30% of CSU Honors Program students from within CNS degree programs.

Success Target: Re-establish and grow the participation in the Honor's Program so every CNS Department offers Honors-only sections.

- 1.7 **Applied Master's Degrees:** The College is responsive to changing educational and job market needs and addresses them in part by cross-disciplinary course clusters at the undergraduate level and by unique on-campus and on-line professional science masters programs. Currently the College has one Professional Science Master's degree programs and three applied Master's degrees.

Success Target: Add at least two additional PSM or Applied Master's degrees to the College.

- 1.8 **Distance and Hybrid Courses:** The College needs to be positioned to respond to student needs and desires for distance and hybrid courses and degree programs. A sustainable financial model must be developed to ensure that the instruction of these courses is of the highest quality possible while also enabling the College to expand its distance offerings.

Success Target: Develop comprehensive plan for management of distance and hybrid courses.

[2] FACULTY & STAFF

All employees of the College (faculty, staff, postdoctoral fellows, and student assistants) play an essential role in the success of the College and are the creative engine that drives this university. It is particularly important that the College leadership encourage the individual talents of its people and their willingness to work together. It must visibly value diverse strengths, and when appropriate, make creative job assignments. The College must be clear about its expectations, publicly recognize and value contributions, and embrace broad inclusion of many people in its decision-making processes.

The College strives to provide its faculty with an environment in which they can succeed in their teaching and scholarship, including appropriate space, time, infrastructure, and incentives. The expectation is that all members of the faculty will contribute to the research, teaching, and outreach/service missions of the College. The College recognizes and expects that faculty will achieve this in varying ways and that the balance among these activities may change throughout the course of their careers. Furthermore, the College acknowledges the value of non-traditional appointments, such as special faculty whose primary responsibilities are in teaching and advising. The College is receptive to joint appointments, spousal accommodations, and other strategies for attracting and retaining the best candidates to the College and University. Similarly, the College is proactive in offering appropriate incentives to retain its most productive faculty.

For the past several years the College leadership has worked to identify strengths within the College and to recruit faculty to build on those strengths. Departments are expected to maintain long-term hiring plans that stress strategic investments when positions become open. The College gives a high priority to the development of future leadership. In many cases, it can rotate newer people into pre-leadership positions and provide appropriate mentoring. At the same time, it has a large reservoir of talent and experience among its emeritus faculty and retired staff, as well as a broad and dedicated base of alumni, who can provide the College with unique expertise in many ways.

Objectives

2.1 **Workload Distributions:** All regular faculty contribute in varying degrees to all aspects of the tri-partite mission, i.e. research, teaching, service/outreach. Faculty workload distributions must be individualized to maximize faculty productivity and success. Annual evaluations should be directly tied to the workload distribution. Individual workloads should reflect a distribution that is appropriately balanced for the success of the individual and the Department.

Success Target: Individualized workload distributions for all regular faculty with the expectation that the overall College distribution be near 45:45:10 research:teaching:service.

Success Target: The College will expect clear statements from each Department of its expectations and measures of faculty research and teaching

excellence, and will monitor the use of these in promotion, tenure, annual evaluations, and workload assignments.

- 2.2 **Faculty Recruitment:** The College places its highest priority on recruiting and retaining the best faculty. In order to meet the CSU 2020 goals of adding 8,000 additional students while maintaining the current CNS student to faculty ratio, the College must make plans to add at least 80 new regular faculty lines across its eight departments. Strategies for adding new faculty include: building on current strengths, expanding interdisciplinary programs, and using cluster hiring among the College's departments and with other colleges.

Success Target: Improve Student FTE:Regular Faculty FTE from the current ~31:1 to approach University average of 20:1.

Success Target: Increase number of regular faculty by 80 to address CSU 2020 growth.

- 2.3 **Staffing:** To meet the challenges of CSU 2020, each of the CNS departments needs to optimize its staffing. This includes appropriate balance of faculty (tenure and non-tenure track), instructors, support staff, and advisers. The creative use of dual-role positions, e.g. academic support coordinators who are also instructors, is encouraged.

Success Target: Appropriate growth and balance in staffing to support the goals of this strategic plan.

- 2.4 **Professional Development:** The College places a high priority on the professional development of its employees. In particular, it encourages leadership development via professional training programs, increased leadership opportunities, mentoring programs, and networking.

Success Target: All departments encourage and support professional development opportunities for employees.

[3] RESEARCH EXCELLENCE

The College considers discovery and application, i.e. basic and translational research, to be the core mission of a research university and central to the land-grant mission of Colorado State University. Its focus is on building excellence in targeted research areas in each of its departments using international recognition, graduates that make an impact, and availability of external funding to guide its investment decisions. The College of Natural Sciences can best compete through both focused scientific themes and creative interdisciplinary thrusts that complement existing and/or emerging areas of excellence in faculty research. The College has a particular interest in utilizing synergies across disciplinary lines to expand its research opportunities. Faculty hires, especially cluster hires, are one strategy to achieve expertise in key areas; interdisciplinary approaches are another. To be successful, the College is aware that it

needs to focus its resources, give clear expectations to its faculty, assist with internal review of new proposals, and support increased visibility of its research in the larger community.

The College has a specific commitment to include students in all of its research activities. It maintains high-quality PhD programs in all of its disciplines and is heavily engaged in interdisciplinary graduate degree programs across campus. It will continue to provide incentives to encourage an increasing number of top-quality students in all fields to enroll in its PhD programs and to complete their degrees.

Quality research space is a University-wide challenge that must be met in order to maintain competitiveness and accommodate expansion in research. Appropriate research space as well as teaching space is particularly important for the many experimental, lab-intensive programs within the College. The College must therefore work in concert with the University to enhance the size and quality of research space while also assisting with the development of creative mechanisms for space reassignment to meet both growth and specific opportunities. The College has urgent space needs in several departments, in some cases threatening the competitiveness of strong research programs, and it must immediately engage with the University to find creative and timely solutions.

Objectives

- 3.1 **Enhancing Programs:** The College will support the enhancement and development of strong research programs in order to meet its goal to build excellence in areas that demonstrate impact and recognition for the departments and College as a whole.

Success Target: Each department will identify/propose/enhance at least one flagship research program.

- 3.2 **Research Success:** Increase faculty research success, as evidenced by impact including recognition within the discipline, quality and number of PhDs, and extramural funding.

Success Target: Increase average College PhD production from 0.4 to 0.5 PhD graduates per faculty member per year.

Success Target: Increase research expenditures from \$33M to \$50M by 2020.

Success Target: Increase number of national and international honors and awards received by College faculty.

- 3.3 **Research Facilities:** Research facilities must be enhanced and expanded to support a high level of research excellence. Utilization of current space must be optimized, and new space must be developed through a variety of strategies.

Success Target: No grants declined, faculty line offers refused, or students turned away due to inadequate facilities.

- 3.4 **Personnel and Infrastructure:** The College must make strategic investments in research-support personnel and other aspects of its infrastructure. Some aspects include: faculty start-up packages, cost shares, pre-tenure travel program, return of ICR to PIs, and expense tracking.

Success Target: No missed opportunities due to lack of research support.

[4] EXTERNAL ENGAGEMENT

As Colorado's land-grant university, Colorado State University has a commitment to serve the people and the state. Likewise, the College has a responsibility to enhance the scientific and mathematical literacy of the general citizenry through a variety of engagement programs, including on-campus and distance-education courses, student internships, and assistance to groups and individuals in the land-grant tradition. Furthermore, as a key college in a mature research university, Natural Sciences has a broad responsibility to share its expertise nationally and worldwide through various communication channels and technology transfer mechanisms. Much of this expertise extends naturally to professional societies as well as industrial, governmental, and economic partners external to Colorado State University.

The College has a responsibility to enhance the scientific and mathematical literacy of the general citizenry through a variety of communication possibilities, including on-campus and distance education programs, outreach to the community and to pre-K-12 education, student internships, and service to professional societies.

In response to national demands, the College offers unique majors (e.g. zoology) and graduate programs (e.g. the first Professional Science Master's degree at CSU) of particular interest to non-resident students. In addition, the College trains many secondary and in-service teachers of STEM disciplines and seeks to inspire pre-university students (particularly those at Alliance Partner schools) through programs such as CO-AMP, the Education & Outreach Center, the Little Shop of Physics, Math Day, and the University STEM Center. Partnership with pre-K-12 education both inside and outside Colorado is a central part of the College mission, and one that will be further developed and broadened in the coming years.

The success of the College is in part due to the success of its fundraising efforts. The College will increase its investments and returns from the fundraising activities of the Dean's Office development team and encourage more participation by the department chairs and faculty. The College will coordinate with the University's centralized efforts and collaborate on any upcoming Capital Campaign for more effective fundraising and alumni relations.

Objectives

- 4.1 **Preparing STEM Teachers:** The College aims to be Colorado's hub for the preparation of science and math teachers.

Success Target: Hire additional tenure-track CNS faculty whose scholarship is in science education research to cover range of STEM disciplines and teacher licensure areas.

Success Target: Effective partnership with the School of Education and the School of Teacher Education and Principal Preparation in order to increase the number of CNS students receiving teaching certification each year by 20%.

Success Target: Active participation from each CNS department in the University STEM Center.

- 4.2 **External Outreach:** All departments are expected to engage in external outreach. The College will encourage and support programs that increase engagement with the community and with K-12 students and teachers.

Success Target: Well-developed and coordinated outreach programs in all departments, including for example, faculty involvement in the Education & Outreach Center.

- 4.3 **Professional Service:** The College encourages departments and individual faculty to provide service to their specific disciplines, including organizing on-campus workshops and conferences. It desires increased recognition of its faculty and programs as national leaders, via metrics such as number of societal fellows, representation of its faculty on editorial boards, number of officers in professional societies, and proposal and manuscript review activity.

Success Target: University leader in professional service activities and faculty named as fellows in professional societies.

- 4.4 **Branding and Marketing:** Promote the CNS through bold and aggressive branding, marketing, and public relations campaigns.

Success Target: Add position on the Dean's Office staff for external relations and to coordinate activities across departments.

- 4.5 **Fundraising:** Increase fundraising directed especially toward investments in faculty, scholarships, STEM outreach, and facilities.

Success Target: Each Department Chair together with their faculty engaged with the College development team in identification, cultivation, solicitation, and stewardship of prospective donors.

Success Target: Align College fundraising priorities with this plan.

Success Target: The three-year running average will exceed \$5M annually.

[5] CONTINUOUS IMPROVEMENT

Continuous improvement first requires the ability to quantify achievement in teaching and scholarship and to document this achievement in a format that allows an analysis of trends and an assessment of the effectiveness of specific interventions. Secondly, it requires a commitment to seek effective pedagogical strategies in classroom instruction, examination, advising and retention as well as effective strategies in scholarship and research. The College uses a customized Faculty Activity System as well as PRISM and a quarterly financial reporting system to monitor activity and progress. Regular College Executive Committee meetings provide a forum for discussion. Topics under continuous review include curriculum and teaching, research productivity, credit hour production, hiring plans, indirect cost recovery, and graduate student graduation rates. Strategic planning and long-term goals are generated on the basis of these discussions. The College and its people need to be cognizant of contemporary issues that require modification of College programs and procedures, and individuals within the College must be ready to change their assignments to accommodate improvement and change. The College must embrace the discussion of new educational ideas and shifting research priorities, and it needs to periodically review its high-level priorities and goals.

Objectives

- 5.1 **Departmental Strategic and Hiring Plans:** Each department is expected to have a strategic plan, which includes a hiring plan, to guide its growth and development. Plans should be reviewed annually and refreshed at least once every two years.

Success Target: Strategic plans incorporating hiring plans for all departments by July 2013. Hiring plans reviewed and refreshed annually prior to start of hiring season.

Success Target: Hold annual meeting of College Executive Committee shortly after spring semester to review and refresh College strategic plan and departmental hiring plans.

- 5.2 **Faculty Activity System and PRISM:** The College will effectively track key data, currently via the Faculty Activity System (FAS) and the University-wide PRISM system. All faculty are expected to use these systems and maintain current information in the database on an annual basis.

Success Target: Full faculty and departmental compliance.

- 5.3 **Instructional Innovation and Improvement:** Continuous improvement in teaching is encouraged by the College. Support currently includes funding for course development and re-development, teaching luncheons, and distance and hybrid course development and instruction.

Success Target: The College is seen as the University model for instructional innovation and improvement.